

Purpose: To take in, break up, and absorb the energy and nutrients in food; then excrete the waste. *(Break down macromolecules, then absorb resulting micromolecules)*

# DIGESTIVE SYSTEM

## MAJOR ORGANS

### MOUTH

Initial intake of food. Starts to soften and break down food by mechanical means using teeth and tongue; chemically, saliva uses enzymes like amylase to convert starches into sugars.

### ESOPHAGUS

Connects mouth to stomach. Made of smooth muscle tissue. Moves food (involuntarily) using a rhythmic pattern of waves (peristalsis).

### STOMACH

Stores and processes food with digestive enzymes such as hydrochloric acid. Enzymes do not break down food, but instead ensure it is sterile (no bacteria) and has the right acidity. Mucus protects enzymes from harming the body.

### SMALL INTESTINE

About 6m long and narrow in diameter. Digestion process is now completed and nutrients from food are absorbed.

### LARGE INTESTINE

About 1.5m long and wider in diameter. Receives indigestible food from small intestine, absorbing water content. Too much (constipation) or too little (diarrhea) water absorption results in abnormal stools.

## PRODUCTS

- CARBOHYDRATES ⇒ GLUCOSE
- PROTEINS ⇒ AMINO ACIDS
- FATS + TRIGLYCERIDES ⇒ FATTY ACIDS + GLYCEROL

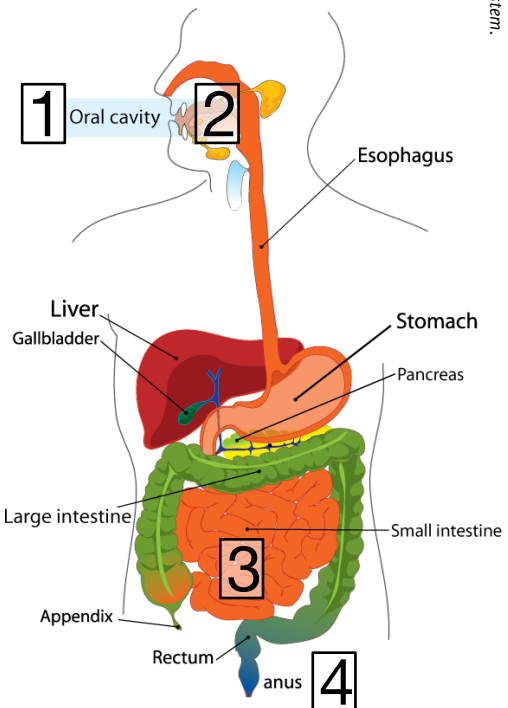
## ACCESSORY ORGANS

- LIVER**  
Helps detoxify food and releases bile, which helps to break down fats.
- PANCREAS**  
Produces insulin to regulate glucose levels in blood.
- GALL BLADDER**  
Stores bile.
- RECTUM**  
Stores waste material until bowel movement.
- ANUS**  
Opening through which waste material leaves the body.

## PROCESS

- 1 **INGESTION:** Intaking the food
- 2 **DIGESTION:** Breaking down food by chemical and mechanical means
- 3 **ABSORPTION:** Absorbing nutrients from digested molecules
- 4 **EGESTION:** Removing waste materials from the body

An adult human has about a 9m long digestive system. The entire process takes from 9 to 72 hours.



## DISORDERS

- APPENDICITIS**  
The appendix becomes inflamed due to mucus/feces build up.  
Symptoms: dull abdominal pain, loss of appetite, nausea.  
Treatment: appendectomy (removal of appendix).
- CELIAC DISEASE**  
The small intestine reacts allergically to gluten and becomes inflamed. In presence of gluten, lining of small intestine cannot fully absorb all nutrients.  
Symptoms: diarrhea, weight loss, fatigue, bloating.  
Treatment: gluten-free diet.
- DIABETES**  
Blood has an absence of insulin; glucose levels are no longer regulated.  
Symptoms: weight loss, increasing appetite, blurred vision, dehydration.  
Treatment: insulin injection, exercise, diabetic diet.
- GALLSTONES**  
Undissolved cholesterol clumps together to form gallstones.  
Symptoms: biliary colic (gallstone blocks bile ducts, bile builds up).  
Treatment: cholecystectomy (removal of gall bladder), extraction of gallstones.
- GASTROESOPHAGEAL REFLUX DISORDER (GERD)**  
Stomach acids regurgitates into esophagus, inflaming and damaging its thin mucous layer.  
Symptoms: heartburn, nausea, regurgitation.  
Treatment: eating habits (no chocolate, peppermint, alcohol, caffeine).
- GINGIVITIS**  
Inflammation of the gums by bacteria, caused by plaque build-up.  
Symptoms: bleeding/swollen gums, mouth sores.  
Treatment: careful oral hygiene.
- HIATUS HERNIA**  
Stomach crowds and protrudes through diaphragm, commonly due to obesity.  
Symptoms: dull chest pains, shortness of breath.  
Treatment: weight loss, medication, surgery.
- ULCERATIVE COLITIS**  
The inflammation of the large intestine (colon), most likely caused by a foreign bacteria.  
Symptoms: abdominal pain, diarrhea, bloody stools.  
Treatment: anti-inflammatory medication.